



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

WASHINGTON, D.C. 20460

OFFICE OF
PREVENTION, PESTICIDES
AND TOXIC SUBSTANCES

MEMORANDUM

DATE: 22- JAN-2007

SUBJECT: **Coumaphos** Acute and Chronic Aggregate Dietary Exposure and Risk
Assessments for the Proposed Section 3 Registration on Honey.

PC Code: 036501
DP Number: D335163

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Executive Summary

Acute and chronic aggregate dietary (food and drinking water) exposure and risk assessments were conducted using the Dietary Exposure Evaluation Model DEEM-FCID™, Version 2.03 which uses food consumption data from the U.S. Department of Agriculture's Continuing Surveys of Food Intakes by Individuals (CSFII) from 1994-1996 and 1998. These dietary exposure and risk assessments for coumaphos include the following: (1) Section 3 requests for coumaphos in honey; (2) new acute toxicological endpoint; (3) and the latest PDP monitoring data for beef and milk.

Acute Dietary (Food and Drinking Water) Exposure Results and Characterization

A partially refined acute dietary exposure assessment was conducted to estimate the dietary exposure and risk associated with the proposed Section 3 registration of coumaphos on honey. The acute dietary exposure assessment incorporated 2002 PDP monitoring data for beef and 2004 PDP monitoring data for milk. Field trial data were used for honey to support the proposed use pattern. The dietary exposure assessment assumes 100% crop treated for the acute analysis.

The GENEEC and SCI-GROW screening models were used to estimate surface water and groundwater concentrations of coumaphos and its oxygen analog, coumaphoxon. Tier 1 GENEEC screening model, representing a worst-case runoff scenario for pesticides in surface water, was used to estimate the upper-bound concentrations in surface water. Total coumaphos (coumaphos + coumaphoxon) acute estimated environmental concentrations in drinking water derived from surface water sources are not likely to exceed 1.86 ppb.

The acute aggregate dietary exposure estimates are below HED's level of concern (<100 % aPAD) for the U.S. population and all population subgroups. Combined dietary exposure from food and drinking water at the 99.9th percentile of exposure is 15% of the aPAD for the U.S. population and 38% of the aPAD for all infants (<1 yr), the most highly exposed population subgroup.

Chronic Dietary (Food and Drinking Water) Exposure Results and Characterization

A partially refined chronic dietary exposure assessment was conducted to estimate the dietary risks associated with the registration of coumaphos. The chronic dietary exposure assessment incorporated the latest PDP monitoring data, average field trial data for honey and assumed 100% crop treated. Total coumaphos (coumaphos + coumaphoxon) chronic estimated environmental concentrations in drinking water derived from surface water sources are not likely to exceed 0.41 ppb.

The chronic aggregate dietary exposure estimates are below HED's level of concern (< 100% of the cPAD) for the U.S. population and all population subgroups. Combined dietary exposure from food and drinking water is 6% of cPAD for the U.S. population and 13% of the cPAD for all infants (<1 yr), the most highly exposed population subgroup.

Cancer Dietary (Food and Drinking Water) Exposure Results and Characterization

Coumaphos was classified as "not likely to be a human carcinogen," therefore a cancer dietary assessment was not performed.

I. Introduction

Dietary risk assessment incorporates both exposure and toxicity of a given pesticide. For acute and chronic assessments, the risk is expressed as a percentage of a maximum acceptable dose (i.e., the dose which HED has concluded will result in no unreasonable adverse health effects). This dose is referred to as the population adjusted dose (PAD). The PAD is equivalent to point of departure (POD; NOAEL, LOAEL, e.g.) divided by the required uncertainty or safety factors.

For acute and non-cancer chronic exposures, HED is concerned when estimated dietary risk exceeds 100% of the PAD. References which discuss the acute and chronic risk assessments in more detail are available on the EPA/pesticides web site: "Available Information on Assessing Exposure from Pesticides, A User's Guide," 21-JUN-2000, web link:

<http://www.epa.gov/fedrgstr/EPA-PEST/2000/July/Day-12/6061.pdf>; or see SOP 99.6 (20-AUG-1999).

The most recent dietary risk assessment for coumaphos was conducted by W. Cutchin (13-OCT-2000, D267978).

II. Residue Information

Coumaphos (*O*-[3-chloro-4-methyl-2-oxo-2*H*-1-benzopyran-7-yl] *O,O*-diethyl phosphorothioate) is an organophosphate insecticide/acaricide currently used for the control of mites and insects on livestock. Permanent tolerances are established for the residues of coumaphos and its oxygen analog (coumaphos-OP) at 1.0 ppm in fat, meat, and meat byproducts of cattle, goats, hogs, horses, and sheep, along with a tolerance at 0.5 ppm in milk fat (40CFR §180.189[a]). Time-limited tolerances have also been established for residues of coumaphos and its oxygen analog at 0.1 and 100 ppm, respectively, in honey and honeycomb (40CFR §180.189[b]), associated with Section 18 emergency uses in beehives; these tolerances are set to expire on 12/31/2007.

No plant metabolism data are required as coumaphos is not registered for use on plants. The nature of the residue in livestock is understood, based on an adequate cow metabolism study reflecting dermal dosing. The residues of concern in livestock are coumaphos and its oxygen analog. The existing animal metabolism data are adequate for purposes of the proposed use on honeybees. The residues of concern in honeybee products (honey and honeycomb) are coumaphos and coumaphos-OP.

Residue Data used for Acute and Chronic Dietary Assessments

Interregional Research Project #4 (IR-4) has submitted a petition (PP#2E6504) proposing a Section 3 registration for the use of coumaphos-impregnated strips in beehives for the control of varroa mites and small hive beetles. The strips (CheckMite+ Bee Hive Pest Control Strips) contain 10% coumaphos, the active ingredient (ai), by weight. The proposed label would allow for use of up to two 10% strips hung in the hive's brood chamber for control of varroa mites, and the concurrent use of another 10% strip attached to the bottom board for control of small hive beetles. The strips could remain in the hive for up to 45 days, and the application could be made

at anytime during the year, including during honey flow (honey accumulation). HED recommends the establishment of permanent tolerances for the combined residues of coumaphos and its oxygen analog at 0.15 ppm in honey, and 45 ppm in honeycomb (W. Drew, D036501).

Honey (partially blended): The entire distribution of field trial residues (0.034, 0.034, 0.071, 0.032, 0.055, 0.034, 0.074, 0.037, 0.052, 0.020, and 0.021 ppm) from two 10% strips (1x rate) at 0-13 days were used at 100% crop treated in the acute dietary analysis. An average field trial residue value of 0.042 ppm was calculated for chronic dietary assessment. See Table 1 below.

Beef (Adipose): PDP data from 2002 were used for beef adipose. A total of 301 samples were analyzed for coumaphos and coumaphos oxygen analog. Coumaphos and coumaphos oxygen analog were not detected in any samples. An anticipated residue value of 0.00375 ppm which represents $\frac{1}{2}$ the combined LOQ (limit of quantitation) values of coumaphos and its oxygen analog was used for the acute and chronic dietary analyses and 100% crop treated was assumed.

Beef (liver): PDP data from 2002 were used for beef liver. A total of 313 samples were analyzed for coumaphos and coumaphos oxygen analog. Coumaphos and coumaphos oxygen analog were not detected in any samples. An anticipated residue value of 0.00375 ppm which represents $\frac{1}{2}$ the combined LOQ (limit of quantitation) values of coumaphos and its oxygen analog was used for the acute and chronic dietary analyses and 100% crop treated was assumed.

Beef (muscle): PDP data from 2002 were used for beef liver. A total of 310 samples were analyzed for coumaphos and coumaphos oxygen analog. Coumaphos and coumaphos oxygen analog were not detected in any samples. An anticipated residue value of 0.00375 ppm which represents $\frac{1}{2}$ the combined LOQ (limit of quantitation) values of coumaphos and its oxygen analog was used for the acute and chronic dietary analyses and 100% crop treated was assumed.

Milk: PDP data from 2004 were used for milk. A total of 739 samples were analyzed for coumaphos and coumaphos oxygen analog. Coumaphos and coumaphos oxygen analog were not detected in any samples. An anticipated residue value of 0.00013 ppm which represents $\frac{1}{2}$ the combined LOQ (limit of quantitation) values of coumaphos and its oxygen analog was used for the acute and chronic dietary analyses and 100% crop treated was assumed.

Processing Factors: An adequate honey processing study is available, which used samples of raw honey fortified with coumaphos, and samples of raw honey with field-incurred residues of coumaphos. Following processing of raw honey by heating and filtration, coumaphos residues were reduced in the final honey fractions by 0.5x. A default processing factor for dried beef of 1.92 was also used.

Table 1. Data and Residue Estimates Used in Dietary Analyses for Couamphos											
RAC ¹	Food Forms	Classification ²	Data Source	No. of Samples	No. of Detectable Residues	LOQ ³ (ppm)	%CT		Processing Factors	Anticipated Residue Estimates/Tolerance	
							Ave.	Max.		Acute (Tol., AR, RDF) ppm	Chronic (Tol., AR) ppm
Honey	All	PB	Field Trial	11	11	0.010	100	100	0.5	RDF #1 Honey FT 100%CT TOTALNZ=11 TOTALZ=0 0.034, 0.034 0.071, 0.032 0.055, 0.034 0.074, 0.037 0.052, 0.020 0.021	0.042
Beef (adipose-fat)	All	--	2002 PDP	301	0	0.0075	100	100	--	0.00375	0.00375
Beef (liver)	All	--	2002 PDP	313	0	0.0075	100	100	--	0.00375	0.00375
Beef (muscle-meat)	All	--	2002 PDP	310	0	0.0075	100	100	1.92 meat dried meat	0.00375	0.00375
Milk	All	--	2004 PDP	739	0	0.0003	100	100	--	0.00013	0.00013

1. Beef was translated for goat, sheep horse, hog and rabbit.
2. Classification of blended (B), partially blended (PB), not blended (NB).
3. Average LOQs of coumaphos + oxygen analog

III. Drinking Water Data

Reference: *Finalization of Interim Reregistration Eligibility Decisions (IREDs) and Interim Tolerance Reassessment and Risk Management Decisions (TREDs) for the Organophosphate Pesticides, and Completion of the Tolerance Reassessment and Reregistration Eligibility Process for the Organophosphate Pesticides*; D. Edwards, 31-JUL-2006.

The GENEEC and SCI-GROW screening models were used to estimate surface water and groundwater concentrations of coumaphos and its oxygen analog, coumaphoxon. This degradate is considered in the drinking water assessment, because it is part of the tolerance expression. The acute and chronic surface water values (1.86 ppb and 0.41 ppb) were incorporated directly into these dietary assessments under the DEEM-FCID food categories "water, direct, all sources" and "water, indirect, all sources." The model and its description are available at the EPA internet site:

<http://www.epa.gov/oppefed1/models/water/>.

Surface Water: Tier 1 GENEEC screening model, representing a worst-case runoff scenario for pesticides in surface water, was used to estimate the upper-bound concentrations in surface water. Total coumaphos (coumaphos + coumaphoxon) acute and chronic estimated environmental concentrations in drinking water derived from surface water sources are not likely to exceed 1.86 ppb and 0.41 ppb, respectively.

Ground Water: A Tier 1 screening model, SCI-GROW, was used to estimate total coumaphos concentrations in ground water. This is an empirical model based on field data from prospective ground water studies. Estimated environmental concentration of total coumaphos, representing acute and chronic exposures to ground water, is 0.17 ppb. Ground water sources were not included in this assessment, as the estimated environmental concentration for this water source is minimal in comparison to surface water.

The recommended application rate for coumaphos spent solution from dip vat operations on non-agricultural land is 10,000 liters (L) of coumaphos spent solution containing 10 ppb spread over a one-acre field. A conversion efficiency of coumaphos to coumaphoxon of 10.2% was derived from available (supplemental) data on photodegradation in water. This conversion efficiency was used to estimate a coumaphoxon application rate of 0.02 lbs ai/A.

IV. DEEM-FCID™ Program and Consumption Information

Coumaphos acute and chronic dietary exposure assessments were conducted using the Dietary Exposure Evaluation Model software with the Food Commodity Intake Database DEEM-FCID™, Version 2.03 which incorporates consumption data from USDA's Continuing Surveys of Food Intakes by Individuals (CSFII), 1994-1996 and 1998. The 1994-96, 98 data are based on the reported consumption of more than 20,000 individuals over two non-consecutive survey days. Foods "as consumed" (e.g., apple pie) are linked to EPA-defined food commodities (e.g. apples, peeled fruit - cooked; fresh or N/S; baked; or wheat flour - cooked; fresh or N/S, baked) using publicly available recipe translation files developed jointly by USDA/ARS and EPA. For chronic exposure assessment, consumption data are averaged for the entire U.S. population and within population subgroups, but for acute exposure assessment are retained as individual consumption events. Based on analysis of the 1994-96, 98 CSFII consumption data, which took into account dietary patterns and survey respondents, HED concluded that it is most appropriate to report risk for the following population subgroups: the general U.S. population, all infants (<1 year old), children 1-2, children 3-5, children 6-12, youth 13-19, adults 20-49, females 13-49, and adults 50+ years old.

For chronic dietary exposure assessment, an estimate of the residue level in each food or food-form (e.g., orange or orange juice) on the food commodity residue list is multiplied by the average daily consumption estimate for that food/food form to produce a residue intake estimate. The resulting residue intake estimate for each food/food form is summed with the residue intake estimates for all other food/food forms on the commodity residue list to arrive at the total average estimated exposure. Exposure is expressed in mg/kg body weight/day and as a percent of the cPAD. This procedure is performed for each population subgroup.

For acute exposure assessments, individual one-day food consumption data are used on an individual-by-individual basis. The reported consumption amounts of each food item can be multiplied by a residue point estimate and summed to obtain a total daily pesticide exposure for a deterministic exposure assessment, or "matched" in multiple random pairings with residue values and then summed in a probabilistic assessment. The resulting distribution of exposures is expressed as a percentage of the aPAD on both a user (i.e., only those who reported eating relevant commodities/food forms) and a per-capita (i.e., those who reported eating the relevant commodities as well as those who did not) basis. In accordance with HED policy, per capita exposure and risk are reported for all tiers of analysis. However, for tiers 1 and 2, any significant differences in user vs. per capita exposure and risk are specifically identified and noted in the risk assessment.

V. Toxicological Information

The acute dietary endpoint for the general population is based on plasma, erythrocyte and brain ChE inhibition (measured at time of peak inhibition) in PND 11 rats following a single oral dose in the comparative cholinesterase study. This endpoint, selected by the coumaphos risk assessment team (Dec 2006), is considered appropriate for the general population because the effects were observed following a single dose, and the route of administration (oral) is appropriate for dietary considerations. Previously, the acute dietary endpoint was based on plasma and erythrocyte ChE inhibition observed in rats at a LOAEL of 2 mg/kg (no NOAEL was observed) in an acute neurotoxicity study. The newly selected endpoint is protective of this effect, as well as all others seen in the mammalian toxicology database attributable to a single dose.

A separate acute dietary endpoint for female ages 13-49 years was not selected because coumaphos does not induce any effects attributable to a single dose, including developmental effects that would affect this population subgroup.

The chronic dietary endpoint, previously selected by the HED HIARC, is based on plasma and RBC ChE inhibition in males and females in the chronic toxicity study in dogs. This endpoint is considered appropriate for chronic dietary exposure due to the oral route of administration and the chronic duration of exposure. The study and endpoint were selected because they are protective of effects observed in all the other available studies, including offspring effects seen in the recently submitted developmental neurotoxicity study.

A summary of the toxicological doses and endpoints selected for the dietary exposure assessments is provided in Table 2.

Table 2: Toxicological Doses and Endpoints for Coumaphos for Use in Dietary Human Health Risk Assessments.

Exposure/ Scenario	Point of Departure	Uncertainty/ FQPA Safety Factors	RfD, PAD, Level of Concern for Risk Assessment	Study and Toxicological Effects
Acute Dietary (<i>General Population, including Infants and Children</i>)	NOAEL = 0.25 mg/kg/day	UF _A = 10x UF _H = 10x FQPA SF = 1x	Acute RfD = 0.0025 mg/kg/day aPAD = 0.0025 mg/kg/day	Comparative cholinesterase study in rats LOAEL = 0.5 mg/kg/day based on plasma (19%/22%; M/F), RBC (20%/19%; M/F), and brain (8%/7%; M/F) ChE inhibition in PND 11 males and females
Chronic Dietary (<i>All Populations</i>)	NOAEL = 0.025 mg/kg/day	UF _A = 10x UF _H = 10x FQPA SF = 1x	Chronic RfD = 0.00025 mg/kg/day cPAD = 0.00025 mg/kg/day	Chronic toxicity study in dogs LOAEL = 0.775/0.705 mg/kg/day (M/F) based on plasma and RBC ChE inhibition in males and females
Cancer Classification	Not likely to be a Human Carcinogen			

Point of Departure (POD) = A data point or an estimated point that is derived from observed dose-response data and used to mark the beginning of extrapolation to determine risk associated with lower environmentally relevant human exposures. NOAEL = no observed adverse effect level. LOAEL = lowest observed adverse effect level. UF = uncertainty factor. UF_A = extrapolation from animal to human (interspecies). UF_H = potential variation in sensitivity among members of the human population (intraspecies). UF_{DB} = to account for the absence of key data (*i.e.*, lack of a comparative cholinesterase study). FQPA SF = FQPA Safety Factor. PAD = population adjusted dose (a = acute, c = chronic). RfD = reference dose.

VI. Results/Discussion

As stated above, for acute and chronic assessments, HED is concerned when dietary risk exceeds 100% of the PAD. The DEEM-FCID™ analyses estimate the dietary exposure of the U.S. population and various population subgroups. The results reported in Tables 3 and 4 are for the general U.S. Population, all infants (<1 year old), children 1-2, children 3-5, children 6-12, youth 13-19, females 13-49, adults 20-49, and adults 50+ years. Cancer risk is determined for the general U.S. population only.

Results of Acute Dietary (Food and Drinking Water) Exposure Analysis

The acute aggregate dietary exposure estimates are below HED's level of concern (<100 % aPAD) for the U.S. population and all population subgroups. Combined dietary exposure from food and drinking water at the 99.9th percentile of exposure is 15% of the aPAD for the U.S. population and 38% of the aPAD for all infants (<1 yr), the most highly exposed population subgroup. The acute aggregate dietary exposure results are shown in Tables 3 and 4.

Table 3. Results of Coumaphos Acute Dietary Exposure Analysis (Food & Drinking Water) Using DEEM FCID

Population Subgroup	aPAD (mg/kg/day)	95 th Percentile		99 th Percentile		99.9 th Percentile	
		Exposure (mg/kg/day)	% aPAD	Exposure (mg/kg/day)	% aPAD	Exposure (mg/kg/day)	% aPAD
General U.S. Population	0.0025	0.000107	4.3	0.000192	7.7	0.000370	15
All Infants (< 1 year old)	0.0025	0.000367	15	0.000524	21	0.000945	38
Children 1-2 years old	0.0025	0.000173	6.9	0.000278	11	0.000399	16
Children 3-5 years old	0.0025	0.000157	6.3	0.000239	9.6	0.000383	15
Children 6-12 years old	0.0025	0.000111	4.4	0.000173	6.9	0.000239	9.6
Youth 13-19 years old	0.0025	0.000089	3.6	0.000142	5.7	0.000252	10
Adults 20-49 years old	0.0025	0.000097	3.9	0.000158	6.3	0.000276	11
Adults 50+ years old	0.0025	0.000087	3.5	0.000124	4.9	0.000199	8.0
Females 13-49 years old	0.0025	0.000097	3.9	0.000149	6.0	0.000263	11

Results of Chronic Dietary (Food and Drinking Water) Exposure Analysis

The chronic aggregate dietary exposure estimates are below HED's level of concern (< 100% of the cPAD) for the U.S. population and all population subgroups. Combined dietary exposure from food and drinking water is 6% of cPAD for the U.S. population and 13% of the cPAD for all infants (<1 yr), the most highly exposed population subgroup. The chronic aggregate dietary exposure results are shown in Table 4.

Table 4. Summary of Dietary Exposure and Risk Estimates for Coumaphos						
Population Subgroup	Acute Dietary (99.9 th Percentile)		Chronic Dietary		Cancer	
	Dietary Exposure (mg/kg/day)	% aPAD	Dietary Exposure (mg/kg/day)	% cPAD	Dietary Exposure (mg/kg/day)	Risk
General U.S. Population	0.000370	15	0.000015	5.9	N/A	N/A
All Infants (< 1 year old)	0.000945	38	0.000032	13		
Children 1-2 years old	0.000399	16	0.000027	11		
Children 3-5 years old	0.000383	15	0.000025	10		
Children 6-12 years old	0.000239	9.6	0.000018	7.1		
Youth 13-19 years old	0.000252	10	0.000012	5.0		
Adults 20-49 years old	0.000276	11	0.000013	5.3		
Adults 50+ years old	0.000199	8.0	0.000013	5.1		
Females 13-49 years old	0.000263	11	0.000012	5.0		

VII. Characterization of Inputs/Outputs

In the course of conducting a refined dietary exposure analysis, decisions are made regarding the following: the residue data used in the analysis (e.g., field trials, monitoring data, etc.), refinements incorporated in the analysis (such as percent crop treated and processing factors).

Coumaphos is an organophosphate insecticide/aracicide currently used for the control of mites and insects on livestock. The assessment for food incorporates refined anticipated residue estimates for livestock commodities that were derived from PDP monitoring (coumaphos and coumaphos oxygen analog). Refinements to percent livestock treated

information were not necessary because risk estimates assuming 100% crop treated were below HED's level of concern.

Total coumaphos (coumaphos + coumaphoxon) acute and chronic estimated environmental concentrations in drinking water were derived from surface water sources. HED believes the environmental concentrations (EECs) are still conservative estimates because most of the coumaphos spent solution resulting from the dip use on livestock is collected and transported to concrete-lined evaporation pits, thereby negating any potential for groundwater contamination.

VIII. Conclusions

Acute and chronic aggregate dietary (food and drinking water) exposure and risk assessments were conducted using the Dietary Exposure Evaluation Model DEEM-FCID™, Version 2.03 which use food consumption data from the U.S. Department of Agriculture's Continuing Surveys of Food Intakes by Individuals (CSFII) from 1994-1996 and 1998. These dietary exposure and risk assessments for coumaphos include the following: (1) Section 3 requests for coumaphos in honey; (2) new acute toxicological endpoint; (3) and the latest monitoring data for beef and milk.

The partially refined acute and chronic aggregate dietary exposure estimates for coumaphos are below HED's level of concern for the general U.S. population and all population subgroups.

IX. List of Attachments

- Attachment 1: DEEM Acute (Food + Drinking Water) Input File
- Attachment 2: DEEM Acute (Food + Drinking Water) Results File
- Attachment 3: DEEM Chronic (Food + Drinking Water) Input File
- Attachment 4: DEEM Chronic (Food + Drinking Water) Results File

cc: S.Piper, CEB

RDl: DE SAC Reviewer: T. Goodlow & S. Stanton 1/9/2007; D.Miller 1/22/2007

7509P: CEB PY-Rm 10244: 308-2717: Coumaphos

Attachment 1: DEEM Acute (Food + Drinking Water) Input File

U.S. Environmental Protection Agency

Ver. 2.02

DEEM-FCID Acute analysis for COUMAPHOS

Residue file name: C:\Documents and

Settings\spiper\SPIPER\coumaphos\coumaphos_acute2006.R98

Analysis Date 01-03-2007

Residue file dated: 01-03-2007/11:03:26/8

Reference dose: aRfD = 0.0025 mg/kg bw/day NOEL = 0.25 mg/kg bw/day

Comment: new use honey; new pdp data for beef and milk

RDL indices and parameters for Monte Carlo Analysis:

Index #	Dist	Parameter #1	Param #2	Param #3	Comment
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1	6	C:\Documents and Settings\spiper\SPIPER\coumaphos\honey.rdf			
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EPA Code	Crop Code	Food Name	Def Res (ppm)	Adj.Factors #1	Adj.Factors #2	RDL Pntr	Comment
21000440	M	Beef, meat	0.003750	1.000	1.000		
21000441	M	Beef, meat-babyfood	0.003750	1.000	1.000		
21000450	M	Beef, meat, dried	0.003750	1.920	1.000		
21000460	M	Beef, meat byproducts	0.003750	1.000	1.000		
21000461	M	Beef, meat byproducts-babyfood	0.003750	1.000	1.000		
21000470	M	Beef, fat	0.003750	1.000	1.000		
21000471	M	Beef, fat-babyfood	0.003750	1.000	1.000		
21000480	M	Beef, kidney	0.003750	1.000	1.000		
21000490	M	Beef, liver	0.003750	1.000	1.000		
21000491	M	Beef, liver-babyfood	0.003750	1.000	1.000		
23001690	M	Goat, meat	0.003750	1.000	1.000		
23001700	M	Goat, meat byproducts	0.003750	1.000	1.000		
23001710	M	Goat, fat	0.003750	1.000	1.000		
23001720	M	Goat, kidney	0.003750	1.000	1.000		
23001730	M	Goat, liver	0.003750	1.000	1.000		
95001860	O	Honey	0.074000	0.500	1.000	1	
95001861	O	Honey-babyfood	0.074000	0.500	1.000	1	
24001890	M	Horse, meat	0.003750	1.000	1.000		
28002210	M	Meat, game	0.003750	1.000	1.000		
27002220	D	Milk, fat	0.000130	1.000	1.000		
27002221	D	Milk, fat - baby food/infant for	0.000130	1.000	1.000		
27012230	D	Milk, nonfat solids	0.000130	1.000	1.000		
27012231	D	Milk, nonfat solids-baby food/in	0.000130	1.000	1.000		
27022240	D	Milk, water	0.000130	1.000	1.000		
27022241	D	Milk, water-babyfood/infant form	0.000130	1.000	1.000		
27032251	D	Milk, sugar (lactose)-baby food/	0.000130	1.000	1.000		
25002900	M	Pork, meat	0.003750	1.000	1.000		
25002901	M	Pork, meat-babyfood	0.003750	1.000	1.000		
25002910	M	Pork, skin	0.003750	1.000	1.000		
25002920	M	Pork, meat byproducts	0.003750	1.000	1.000		
25002921	M	Pork, meat byproducts-babyfood	0.003750	1.000	1.000		
25002930	M	Pork, fat	0.003750	1.000	1.000		
25002931	M	Pork, fat-babyfood	0.003750	1.000	1.000		
25002940	M	Pork, kidney	0.003750	1.000	1.000		
25002950	M	Pork, liver	0.003750	1.000	1.000		
29003120	M	Rabbit, meat	0.003750	1.000	1.000		
26003390	M	Sheep, meat	0.003750	1.000	1.000		
26003391	M	Sheep, meat-babyfood	0.003750	1.000	1.000		
26003400	M	Sheep, meat byproducts	0.003750	1.000	1.000		
26003410	M	Sheep, fat	0.003750	1.000	1.000		
26003411	M	Sheep, fat-babyfood	0.003750	1.000	1.000		
26003420	M	Sheep, kidney	0.003750	1.000	1.000		
26003430	M	Sheep, liver	0.003750	1.000	1.000		
86010000	O	Water, direct, all sources	0.001860	1.000	1.000		

86020000 O Water, indirect, all sources 0.001860 1.000 1.000

Attachment 2: DEEM Acute (Food + Drinking Water) Results File

U.S. Environmental Protection Agency Ver. 2.02
DEEM-FCID ACUTE Analysis for COUMAPHOS (1994-98 data)
Residue file: coumaphos_acute2006.R98 Adjustment factor #2 used.
Analysis Date: 01-03-2007/11:07:57 Residue file dated: 01-03-2007/11:03:26/8
NOEL (Acute) = 0.250000 mg/kg body-wt/day
Daily totals for food and foodform consumption used.
MC iterations = 1000 MC list in residue file MC seed = 10
Run Comment: "new use honey; new pdp data for beef and milk"

Summary calculations (per capita):

95th Percentile			99th Percentile			99.9th Percentile		
Exposure	% aRfD	MOE	Exposure	% aRfD	MOE	Exposure	% aRfD	MOE
U.S. Population:								
0.000107	4.29	2333	0.000192	7.67	1303	0.000370	14.80	675
All infants:								
0.000367	14.68	680	0.000524	20.95	477	0.000945	37.79	264
Children 1-2 yrs:								
0.000173	6.92	1445	0.000278	11.13	898	0.000399	15.95	626
Children 3-5 yrs:								
0.000157	6.29	1588	0.000239	9.58	1043	0.000383	15.34	652
Children 6-12 yrs:								
0.000111	4.43	2259	0.000173	6.92	1445	0.000239	9.56	1046
Youth 13-19 yrs:								
0.000089	3.57	2802	0.000142	5.68	1761	0.000252	10.10	990
Adults 20-49 yrs:								
0.000097	3.88	2576	0.000158	6.31	1583	0.000276	11.05	905
Adults 50+ yrs:								
0.000087	3.47	2880	0.000124	4.94	2024	0.000199	7.97	1254
Females 13-49 yrs:								
0.000097	3.86	2587	0.000149	5.96	1676	0.000263	10.51	951

Attachment 3: DEEM Chronic (Food + Drinking Water) Input File

U.S. Environmental Protection Agency Ver. 2.00
DEEM-FCID Chronic analysis for COUMAPHOS 1994-98 data
Residue file: C:\Documents and Settings\spiper\SPIPER\coumaphos\coumaphos_chronic2006.R98
Adjust. #2 used
Analysis Date 01-03-2007 Residue file dated: 01-03-2007/11:10:13/8
Reference dose (RfD) = 0.00025 mg/kg bw/day
Comment: new use honey; new pdp data for beef and milk

Food Crop			Residue (ppm)	Adj. Factors		Comment
EPA Code	Grp	Food Name		#1	#2	
21000440	M	Beef, meat	0.003750	1.000	1.000	
21000441	M	Beef, meat-babyfood	0.003750	1.000	1.000	
21000450	M	Beef, meat, dried	0.003750	1.920	1.000	
21000460	M	Beef, meat byproducts	0.003750	1.000	1.000	
21000461	M	Beef, meat byproducts-babyfood	0.003750	1.000	1.000	
21000470	M	Beef, fat	0.003750	1.000	1.000	
21000471	M	Beef, fat-babyfood	0.003750	1.000	1.000	
21000480	M	Beef, kidney	0.003750	1.000	1.000	
21000490	M	Beef, liver	0.003750	1.000	1.000	
21000491	M	Beef, liver-babyfood	0.003750	1.000	1.000	
23001690	M	Goat, meat	0.003750	1.000	1.000	
23001700	M	Goat, meat byproducts	0.003750	1.000	1.000	
23001710	M	Goat, fat	0.003750	1.000	1.000	

23001720 M	Goat, kidney	0.003750	1.000	1.000
23001730 M	Goat, liver	0.003750	1.000	1.000
95001860 O	Honey	0.042000	0.500	1.000
95001861 O	Honey-babyfood	0.042000	0.500	1.000
24001890 M	Horse, meat	0.003750	1.000	1.000
28002210 M	Meat, game	0.003750	1.000	1.000
27002220 D	Milk, fat	0.000130	1.000	1.000
27002221 D	Milk, fat - baby food/infant for	0.000130	1.000	1.000
27012230 D	Milk, nonfat solids	0.000130	1.000	1.000
27012231 D	Milk, nonfat solids-baby food/in	0.000130	1.000	1.000
27022240 D	Milk, water	0.000130	1.000	1.000
27022241 D	Milk, water-babyfood/infant form	0.000130	1.000	1.000
27032251 D	Milk, sugar (lactose)-baby food/	0.000130	1.000	1.000
25002900 M	Pork, meat	0.003750	1.000	1.000
25002901 M	Pork, meat-babyfood	0.003750	1.000	1.000
25002910 M	Pork, skin	0.003750	1.000	1.000
25002920 M	Pork, meat byproducts	0.003750	1.000	1.000
25002921 M	Pork, meat byproducts-babyfood	0.003750	1.000	1.000
25002930 M	Pork, fat	0.003750	1.000	1.000
25002931 M	Pork, fat-babyfood	0.003750	1.000	1.000
25002940 M	Pork, kidney	0.003750	1.000	1.000
25002950 M	Pork, liver	0.003750	1.000	1.000
29003120 M	Rabbit, meat	0.003750	1.000	1.000
26003390 M	Sheep, meat	0.003750	1.000	1.000
26003391 M	Sheep, meat-babyfood	0.003750	1.000	1.000
26003400 M	Sheep, meat byproducts	0.003750	1.000	1.000
26003410 M	Sheep, fat	0.003750	1.000	1.000
26003411 M	Sheep, fat-babyfood	0.003750	1.000	1.000
26003420 M	Sheep, kidney	0.003750	1.000	1.000
26003430 M	Sheep, liver	0.003750	1.000	1.000
86010000 O	Water, direct, all sources	0.000410	1.000	1.000
86020000 O	Water, indirect, all sources	0.000410	1.000	1.000

Attachment 4: DEEM Chronic (Food + Drinking Water) Results File

U.S. Environmental Protection Agency
DEEM-FCID Chronic analysis for COUMAPHOS
Residue file name: C:\Documents and
Settings\spiper\SPIPER\coumaphos\coumaphos_chronic2006.R98

Ver. 2.00
(1994-98 data)

Adjustment factor #2 used.

Analysis Date 01-03-2007/11:10:35 Residue file dated: 01-03-2007/11:10:13/8
Reference dose (RfD, Chronic) = .00025 mg/kg bw/day
COMMENT 1: new use honey; new pdp data for beef and milk

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Total exposure by population subgroup

Population Subgroup	Total Exposure	
	mg/kg body wt/day	Percent of Rfd

U.S. Population (total)	0.000015	5.9%
U.S. Population (spring season)	0.000015	5.9%
U.S. Population (summer season)	0.000016	6.2%
U.S. Population (autumn season)	0.000015	5.8%
U.S. Population (winter season)	0.000014	5.8%
Northeast region	0.000014	5.5%
Midwest region	0.000015	6.2%
Southern region	0.000014	5.7%
Western region	0.000016	6.4%

Hispanics	0.000017	6.7%
Non-hispanic whites	0.000014	5.7%
Non-hispanic blacks	0.000015	6.1%
Non-hisp/non-white/non-black	0.000018	7.1%
All infants (< 1 year)	0.000032	12.9%
Nursing infants	0.000012	4.7%
Non-nursing infants	0.000040	16.0%
Children 1-6 yrs	0.000026	10.2%
Children 7-12 yrs	0.000017	6.7%
Females 13-19 (not preg or nursing)	0.000011	4.4%
Females 20+ (not preg or nursing)	0.000013	5.1%
Females 13-50 yrs	0.000013	5.3%
Females 13+ (preg/not nursing)	0.000014	5.6%
Females 13+ (nursing)	0.000017	6.8%
Males 13-19 yrs	0.000014	5.5%
Males 20+ yrs	0.000014	5.4%
Seniors 55+	0.000013	5.1%
Children 1-2 yrs	0.000027	11.0%
Children 3-5 yrs	0.000025	10.1%
Children 6-12 yrs	0.000018	7.1%
Youth 13-19 yrs	0.000012	5.0%
Adults 20-49 yrs	0.000013	5.3%
Adults 50+ yrs	0.000013	5.1%
Females 13-49 yrs	0.000012	5.0%
